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March 9, 1999

BOX PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

Re: Application of Yoshihito ASAO, Kyoko HIGASHINO and
Katsumi ADACHI
ROTOR FOR AN AUTOMOTIVE ALTERNATOR
Our Ref. Q53539

Dear Sir:

Attached hereto is the application identified above including 17 sheets of the specification, claims and Abstract, 7 sheets of drawing, executed Assignment and PTO 1595 form, executed Declaration/Power of Attorney, an Information Disclosure Statement and PTO form 1449 and the certified priority document.

The Government filing fee is calculated as follows:

Total claims	3 - 20	=		x	\$18.00	=	\$0.00
Independent claims	1 - 3	=		x	\$78.00	=	\$0.00
Base Fee							\$760.00
TOTAL FILING FEE							\$760.00
Recordation of Assignment							\$40.00
TOTAL FEE							\$800.00

Checks for the statutory filing fee of \$760.00 and Assignment recordation fee of \$40.00 are attached. You are also directed and authorized to charge or credit any difference or overpayment to Deposit Account No. 19-4880. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 and any petitions for extension of time under 37 C.F.R. § 1.136 which may be required during the entire pendency of the application to Deposit Account No. 19-4880. A duplicate copy of this transmittal letter is attached.

Priority is claimed from September 04, 1998 based on JP Application No. 10-251490. The priority document is enclosed herewith.

Respectfully submitted,
SUGHRUE, MION, ZINN,
MACPEAK & SEAS, PLLC
Attorneys for Applicant

By: Robert J. Seas, Jr.
Robert J. Seas, Jr.
Registration No. 21,092

ROTOR FOR AN AUTOMOTIVE ALTERNATOR

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a rotor for an automotive alternator, which has a Lundell-type field core, for mounting on an automobile engine, and in particular, relates to a winding configuration for winding onto the Lundell-type field core.

Description of the Related Art

Figure 6 is a cross-section of a conventional rotor for an automotive alternator and Figure 7 is a cross-section of part of the rotor shown in Figure 6.

In Figures 6 and 7, a rotor 1 comprises a rotating shaft 11 rotatably supported by a pair of brackets (not shown), a pair of Lundell-type field cores 12a, 12b secured to the rotating shaft 11, a pair of fans 13a, 13b secured to both axial ends of the field cores 12a, 12b, slip rings 14 secured to one end of the rotating shaft 11, and a field winding 15 wound onto the field cores 12a, 12b.

The field cores 12a, 12b are made of iron, comprise cylindrical base portions 121a, 121b fitted over and secured to the rotating shaft 11 and claw-shaped magnetic poles 122a, 122b plurally projecting from the outer circumferential edges of the base portions 121a, 121b, and are secured to the rotating shaft 11 facing each other such that the end surfaces of the base portions 121a, 121b are in close contact with each other and the claw-shaped magnetic poles 122a, 122b intermesh alternately. The field winding 15 is a copper wire with a circular cross-section and is wound a predetermined number

of times onto a bobbin 16 fitted over the outer circumferences of the base portions 121a, 121b. A magnetic flux is generated when an electric current is supplied to the field winding 15 by means of the slip rings 14 and magnetic poles are formed in the field cores 12a, 12b by the magnetic flux.

Inner circumferential tape 17a for protecting the winding is wound onto the cylindrical portion 16a of the bobbin 16. Outer circumferential tape 17c for protecting the winding is also wound onto the outer circumference of the field winding 15 wound onto the bobbin 16. In addition, side tape 17b is disposed between the lead portion of the field winding 15 and the multi-layered portion of the field winding 15.

The construction of the field winding 15 will now be explained with reference to Figures 8 to 10.

The bobbin 16 is made of resin, and as shown in Figure 8, comprises a cylindrical portion 16a and a pair of first and second annular flange portions 16b projecting perpendicularly from both ends of the cylindrical portion 16a. A recessed groove 161 for housing a lead wire 15a at the start of the winding is disposed radially in the inner surface of the first flange portion 16b so as to extend from the outer circumferential side thereof to the cylindrical portion 16a. An anchor portion 16c is disposed on an outer circumferential portion of the first flange portion 16b in close proximity to the upper end of the recessed groove 161.

First, the inner circumferential tape 17a is wound onto the cylindrical portion 16a of the bobbin 16. Then, the starting portion of the field winding 15 is wound around the anchor portion 16c, inserted into the recessed groove 161, and drawn from the lower end (inner circumferential end) of the recessed groove

161 onto the cylindrical portion 16a. At this point, the side tape 17b is pasted onto the inner surface of the first flange portion 16b so as to cover the lead wire 15a at the start of the field winding 15 which is housed in the recessed groove 161. Then, as shown in Figure 9, the field winding 15 drawn out onto the cylindrical portion 16a is lined up in rows at an angle α relative to a plane which perpendicularly intersects the axial center of the cylindrical portion 16a as it is wound onto the cylindrical portion 16a. Then, as shown in Figure 10, when the first layer of the winding is finished, a second layer is lined up in rows at an angle β relative to the plane which perpendicularly intersects the axial center as it is wound onto the cylindrical portion 16a. In this way, the field winding 15 is wound up layer by layer in order from the bottom of the cylindrical portion 16a, and when a predetermined number of layers have been wound, the outer circumferential tape 17c is wound onto the outermost circumferential portion. In addition, the multi-layered portion of the field winding 15 is saturated with varnish. For example, when a field winding 15 is wound onto the cylindrical portion 16a of a bobbin 16 with an outer diameter of 40 to 60 mm, the outermost diametric dimension of the multi-layered portion on which the outer circumferential tape 17c is wound is approximately 70 to 90 mm.

In the rotor 1 constructed in this manner, centrifugal force acts constantly on the field winding 15 during power generation, and even slight gaps and looseness are gradually enlarged, leading to disarray in the winding. Thus, in order to achieve winding without gaps or looseness, it is usual to apply tension to the wire as it is wound onto the bobbin 16, and with respect to the configuration of the start of the winding, to line up the winding in rows at an angle relative to the plane which perpendicularly intersects the axial center as

shown in Figure 9.

In the field winding 15 wound in this manner, the winding in the second layer, for example, is wound on top of the winding in the first layer with the angle reversed. Thus, the winding configuration in the field winding 15 assumes a first condition in which the portions of wire in the second layer are positioned in the exact center between the adjacent portions of wire in the first layer (condition in Figure 11 which is a cross-section taken along line Q - Q in Figure 10), a second condition in which the largest diameter portions of the wire in the first layer and the wire in the second layer are stacked radially (condition in Figure 12 which is a cross-section taken along line P - P in Figure 10), and intermediate conditions which gradually shift from the first condition to the second condition or from the second condition to the first condition. At that time, the height t_1 of the two layers in the second condition is greater than the height t of the two layers in the first condition.

In a conventional rotor for an automotive alternator constructed in this manner, the field winding 15, which has a circular cross-section, is wound onto the bobbin 16 at an angle to a plane which perpendicularly intersects the axial center, and therefore a first condition in which the portions of wire in the n th + 1 layer are positioned in the exact center between the adjacent portions of wire in the n th layer, a second condition in which the largest diameter portions of the wire in the n th layer and the wire in the n th + 1 layer are stacked radially, and intermediate conditions which gradually shift between those conditions.

Thus, one problem is that radial irregularities invariably arise within each lap of the field winding 15 and the configuration of the multi-layered portion thereof consequently has eccentricities, which increases vibrations

during high-speed rotation, leading to bending of the rotating shaft 11 or disconnection of the winding connections.

Another problem is that the space factor in the multi-layered portion reaches a peak, precluding increases in output.

An additional problem is that portions of wire in the second condition are in contact with other portions at points, making resistance to vibrations poor and giving rise to disarray in the winding. By touching the root portions of the claw-shaped magnetic poles 122a, 122b, the outside of the multi-layered portion of the field winding 15 serves the role of damping axial vibrations in the claw-shaped magnetic poles 122a, 122b, and therefore disarray in the winding leads to increased electromagnetic noise.

SUMMARY OF THE INVENTION

The present invention aims to solve the above problems and an object of the present invention is to provide a rotor for an automotive alternator enabling elimination of eccentricities in the multi-layered portion of the field winding and reduction of vibrations during high-speed rotation, and enabling increases in space factor, increases in output, increases in rigidity, and reductions in electromagnetic noise, by winding a flattened field winding onto the bobbin with the flat surfaces as the inner circumferential surface and the outer circumferential surface relative to the radial direction.

In order to achieve the above object, according to one aspect of the present invention, there is provided a rotor for an automotive alternator comprising a pair of field cores each having a cylindrical base portion and a plurality of claw-shaped magnetic poles projecting from the outer

circumferential edges of the base portions, the field cores being secured to a rotating shaft facing each other such that the end surfaces of the base portions are in close contact with each other and the claw-shaped magnetic poles intermesh with each other; a cylindrical bobbin having a cylindrical portion and a pair of first and second annular flange portions projecting perpendicularly from both ends of the cylindrical portion, the bobbin being fitted over the base portions of the pair of field cores; and a field winding wound a predetermined number of turns into multiple layers on the cylindrical portion of the bobbin, wherein the field winding has a flat shape in which a pair of opposite flat surfaces are parallel, the field winding being wound onto the cylindrical portion of the bobbin such that the pair of opposite flat surfaces face the inner circumferential side and the outer circumferential side, respectively, relative to the radial direction.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a partial cross-section of a rotor for an automotive alternator according to Embodiment 1 of the present invention;

Figure 2 is a partial cross-section explaining the wound condition of a portion of a field winding in the rotor for an automotive alternator according to Embodiment 1 of the present invention;

Figure 3 is a partial cross-section explaining the wound condition of another portion of the field winding in the rotor for an automotive alternator according to Embodiment 1 of the present invention;

Figure 4 is a partial cross-section of a rotor for an automotive alternator according to Embodiment 2 of the present invention;

Figure 5 is a partial cross-section of a rotor for an automotive alternator according to Embodiment 3 of the present invention;

Figure 6 is a cross-section of a conventional rotor for an automotive alternator;

Figure 7 is a partial cross-section of the conventional rotor for an automotive alternator;

Figure 8 is a perspective view of a bobbin used in the conventional rotor for an automotive alternator;

Figure 9 is a side elevation explaining the method of winding the field winding in the conventional rotor for an automotive alternator;

Figure 10 is a side elevation explaining the method of winding the field winding in the conventional rotor for an automotive alternator;

Figure 11 is a partial cross-section explaining the wound condition of a portion of the field winding in the conventional rotor for an automotive alternator; and

Figure 12 is a partial cross-section explaining the wound condition of another portion of the field winding in the conventional rotor for an automotive alternator.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention will now be explained with reference to the drawings.

Embodiment 1

Figure 1 is a partial cross-section of a rotor for an automotive alternator

according to Embodiment 1 of the present invention and Figures 2 and 3 are partial cross-sections explaining the wound conditions of portions of a field winding in the rotor for an automotive alternator according to Embodiment 1 of the present invention.

In Figure 1, a field winding 20 is formed from copper wire having a rectangular cross-section which is a flat shape in which a pair of opposite flat surfaces are parallel and the field winding 20 has the same cross-sectional area as the conventional field winding 15 which has a circular cross-section.

The starting portion of this field winding 20 is wound around an anchor portion 16c on the bobbin 16, then inserted into a recessed groove 161, and thereafter drawn from the inner circumferential end of the recessed groove 161 onto the cylindrical portion 16a on which an inner circumferential tape 17a is wound. At this point, side tape 17b is pasted onto the inner wall of a first flange portion 16b so as to cover the lead wire 20a at the start of the field winding 20 which is housed in the recessed groove 161. Then, the field winding 20 drawn out onto the cylindrical portion 16a is lined up in rows at a prescribed angle relative to the plane which perpendicularly intersects the axial center of the cylindrical portion 16a as it is wound onto the cylindrical portion 16a from the first flange portion 16b to a second flange portion 16b. The field winding 20 is wound onto the cylindrical portion 16a such that the pair of parallel flat surfaces face each other relative to the radial direction of the cylindrical portion 16a. Then, when a first layer of winding is finished, a second layer is lined up in rows at a prescribed angle relative to the plane which perpendicularly intersects the axial center in the opposite direction to that of the first layer as it is wound onto the cylindrical portion 16a from the second

flange portion 16b back to the first flange portion 16b. In this way, the field winding 20 is wound up layer by layer in order from the bottom of the cylindrical portion 16a, and when a predetermined number of layers have been wound, the outer circumferential tape 17c is wound onto the outermost circumferential portion. In addition, the multi-layered portion of the field winding 20 is saturated with varnish.

Moreover, the rest of the construction is the same as for the conventional rotor shown in Figures 6 to 8.

The winding configuration of the field winding 20 assumes a first condition in which the portions of wire in the n th + 1 layer are positioned in the exact center between the adjacent portions of wire in the n th layer (condition in Figure 3), a second condition in which the axial surfaces of the wire in the n th layer and the wire in the n th + 1 layer are radially overlapped each other across the entire region in the axial direction (condition in Figure 2), and intermediate conditions which gradually shift from the first condition to the second condition or from the second condition to the first condition. Since the field winding 20 has a rectangular cross-section, the field winding 20 is wound with the radially inner circumferential side of the winding in the n th + 1 layer in surface contact with the radially outer circumferential side of the winding in the n th layer, and the height T of any two layers in the second condition is the same as the height T of any two layers in the first condition. The height of any two layers in the intermediate conditions is also T .

Moreover the height T of any two layers of the field winding 20 is less than the height t of any two layers of the field winding 15.

In this manner, according to Embodiment 1, the field winding 20 has a

rectangular cross-section, enabling the flat surface of the inner circumferential side of the wire in the n th + 1 layer to be in surface contact with the flat surface of outer circumferential side of the wire in the n th layer across the entire region of the cylindrical portion 16a.

Thus, dispersion of diameter of the multi-layered portion in the axial direction of the bobbin is reduced and therefore the multi-layered portion of the field winding 20 can be formed with a uniform diameter without eccentricities. As a result, rotor vibrations induced during high-speed rotation can be suppressed, preventing bending of the rotating shaft 11 and disconnection of the winding connections resulting therefrom. In other words, strength is increased with respect to high-speed rotation.

Also, spacing between portions of the field winding 20 in the radial direction is practically reduced to zero, increasing rigidity, improving resistance to vibrations, and enabling the occurrence of disarray in the winding to be suppressed. Thus, the dumper function of the multi-layer portion is improved, effectively reducing axial vibrations in the claw-shaped magnetic poles 122a, 122b and enabling electromagnetic noise to be reduced.

Furthermore, thermal conductivity between portions of the field winding 20 is improved and radiation of heat increases, enabling high-output to be attained. In other words, the field winding is wound to a high density, enabling a compact, high-output multi-layered portion to be obtained. The thickness of the field winding 20 is small (compared to the outer diameter of the conventional field winding 15), making it possible to wind more coils onto a bobbin of the same size.

In addition, static frictional forces between portions of the field winding

20 and between the field winding 20 and the bobbin 16 are increased, preventing the field winding 20 from slipping.

Embodiment 2

In Embodiment 2, a vibration-suppressing iron ring 21 is fitted into an inner circumferential portion of the claw-shaped magnetic poles 122a, 122b as shown in Figure 4.

Moreover, the rest of the construction is the same as for Embodiment 1.

In a conventional rotor, a field winding 15 with a circular cross-section is used and therefore, if the number of turns in the field winding 15 wound onto the bobbin 16 is increased in order to obtain high output, the outer diameter of the multi-layered portion increases, leaving no space to mount the vibration-suppressing ring 21. Conversely, if space is to be procured to mount the vibration-suppressing ring 21, the number of turns in the field winding 15 wound onto the bobbin 16 must be decreased, and therefore high output cannot be obtained.

However, in Embodiment 2, the field winding 20 can be wound to a high density as in Embodiment 1, enabling the size of the multi-layered portion to be reduced. Thus, space can be procured between the multi-layered portion and the claw-shaped magnetic poles 122a, 122b without reducing output, making it possible to mount the vibration-suppressing ring 21.

Consequently, according to Embodiment 2, in addition to the effects of Embodiment 1, a vibration-suppressing ring 21 is mounted, and therefore the rigidity of the claw-shaped magnetic poles 122a, 122b is increased, effectively reducing axial vibrations in the claw-shaped magnetic poles 122a, 122b and

enabling electromagnetic noise to be reduced further.

Embodiment 3

In Embodiment 3, output enhancing permanent magnets 22 are fitted between each of the claw-shaped magnetic poles 122a, 122b as shown in Figure 5.

Moreover, the rest of the construction is the same as for Embodiment 1.

The permanent magnets 22 fitted between each of the claw-shaped magnetic poles 122a, 122b are exposed to the heat generated by power generation and, therefore, it is necessary to form cooling space for cooling the permanent magnets 22.

In a conventional rotor, a field winding 15 with a circular cross-section is used and therefore, if space is to be procured between the multi-layered portion and the claw-shaped magnetic poles 122a, 122b, the number of turns in the field winding 15 wound onto the bobbin 16 must be decreased, and therefore high output cannot be obtained.

However, in Embodiment 3, the field winding 20 can be wound to a high density as in Embodiment 1, enabling the size of the multi-layered portion to be reduced. Thus, cooling space can be procured between the multi-layered portion and the claw-shaped magnetic poles 122a, 122b without reducing the number of turns in the field winding 20 wound onto the bobbin 16, that is, without reducing output, making it possible to mount the permanent magnets 22.

Consequently, according to Embodiment 3, in addition to the effects of Embodiment 1, permanent magnets 22 are mounted, enabling high-output to be

obtained as well as increasing the rigidity of the claw-shaped magnetic poles 122a, 122b, effectively reducing axial vibrations in the claw-shaped magnetic poles 122a, 122b and enabling electromagnetic noise to be reduced further.

Moreover, in Embodiment 3, the permanent magnets 22 have been fitted separately between each of the claw-shaped magnetic poles 122a, 122b, but the permanent magnets 22 fitted between each of the claw-shaped magnetic poles 122a, 122b may be joined and integrated. In that case, because the permanent magnets 22 are joined and integrated, the rigidity of the claw-shaped magnetic poles 122a, 122b is increased, enabling electromagnetic noise to be reduced even further.

Furthermore, in each of the above embodiments, a field winding 20 with a rectangular cross-section is used, but the field winding is not limited to a rectangular cross-section, and may be any flat shape in which a pair of opposite flat surfaces are parallel, for example, an athletics track-shaped cross-section in which the upper and lower surfaces are parallel and the both end surfaces are convex.

The present invention is constructed in the above manner and exhibits the effects described below.

According to one aspect of the present invention, there is provided a rotor for an automotive alternator comprising a pair of field cores each having a cylindrical base portion and a plurality of claw-shaped magnetic poles projecting from the outer circumferential edges of the base portions, the field cores being secured to a rotating shaft facing each other such that the end surfaces of the base portions are in close contact with each other and the claw-

shaped magnetic poles intermesh with each other; a cylindrical bobbin having a cylindrical portion and a pair of first and second annular flange portions projecting perpendicularly from both ends of the cylindrical portion, the bobbin being fitted over the base portions of the pair of field cores; and a field winding wound a predetermined number of turns into multiple layers on the cylindrical portion of the bobbin, wherein the field winding has a flat shape in which a pair of opposite flat surfaces are parallel, the field winding being wound onto the cylindrical portion of the bobbin such that the pair of opposite flat surfaces face the inner circumferential side and the outer circumferential side, respectively, relative to the radial direction, enabling the provision of a rotor for an automotive alternator enabling elimination of eccentricities in the multi-layered portion of the field winding and reduction of vibrations during high-speed rotation, and enabling increases in space factor, increases in output, increases in rigidity, and reductions in electromagnetic noise.

A vibration-suppressing ring is fitted on the inner circumference of the claw-shaped magnetic poles of the pair of field cores, effectively reducing axial vibrations in the claw-shaped magnetic poles and enabling electromagnetic noise to be reduced without reducing output.

Permanent magnets are fitted between the claw-shaped magnetic poles of the pair of field cores, enabling high-output to be obtained as well as increasing the rigidity of the claw-shaped magnetic poles, effectively reducing axial vibrations in the claw-shaped magnetic poles and enabling electromagnetic noise to be reduced.

WHAT IS CLAIMED IS:

1. A rotor for an automotive alternator comprising:

a pair of field cores each having a cylindrical base portion and a plurality of claw-shaped magnetic poles projecting from the outer circumferential edges of said base portions, said field cores being secured to a rotating shaft facing each other such that the end surfaces of said base portions are in close contact with each other and said claw-shaped magnetic poles intermesh with each other;

a cylindrical bobbin having a cylindrical portion and a pair of first and second annular flange portions projecting perpendicularly from both ends of said cylindrical portion, said bobbin being fitted over said base portions of said pair of field cores; and

a field winding wound a predetermined number of turns into multiple layers on said cylindrical portion of said bobbin, wherein

said field winding has a flat shape in which a pair of opposite flat surfaces are parallel,

said field winding being wound onto said cylindrical portion of said bobbin such that said pair of opposite flat surfaces face the inner circumferential side and the outer circumferential side, respectively, relative to the radial direction.

2. The rotor for an automotive alternator according to Claim 1, wherein a vibration-suppressing ring is fitted on the inner circumference of said claw-shaped magnetic poles of said pair of field cores.

3. The rotor for an automotive alternator according to Claim 1, wherein permanent magnets are fitted between said claw-shaped magnetic poles of said pair of field cores.

ABSTRACT OF THE DISCLOSURE

A rotor for an automotive alternator comprises a cylindrical bobbin fitted over the base portions of a pair of field cores having a cylindrical portion and a pair of first and second annular flange portions projecting perpendicularly from both ends of the cylindrical portion, and a field winding wound a predetermined number of turns into multiple layers on the cylindrical portion of the bobbin, wherein the field winding has a flat shape in which a pair of opposite flat surfaces are parallel, the field winding being wound onto the cylindrical portion of the bobbin such that the pair of opposite flat surfaces face the inner circumferential side and the outer circumferential side, respectively, relative to the radial direction.

FIG. 2

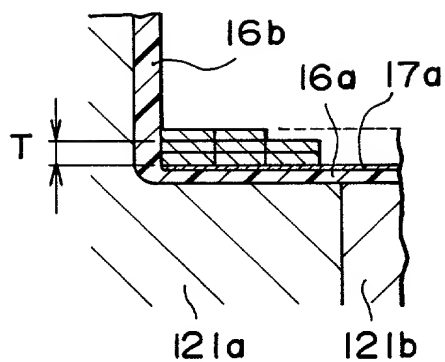


FIG. 3

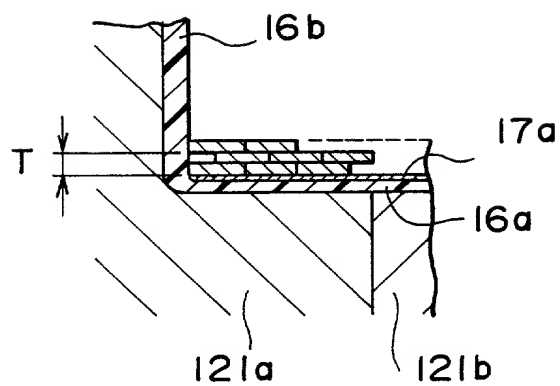


FIG. 4

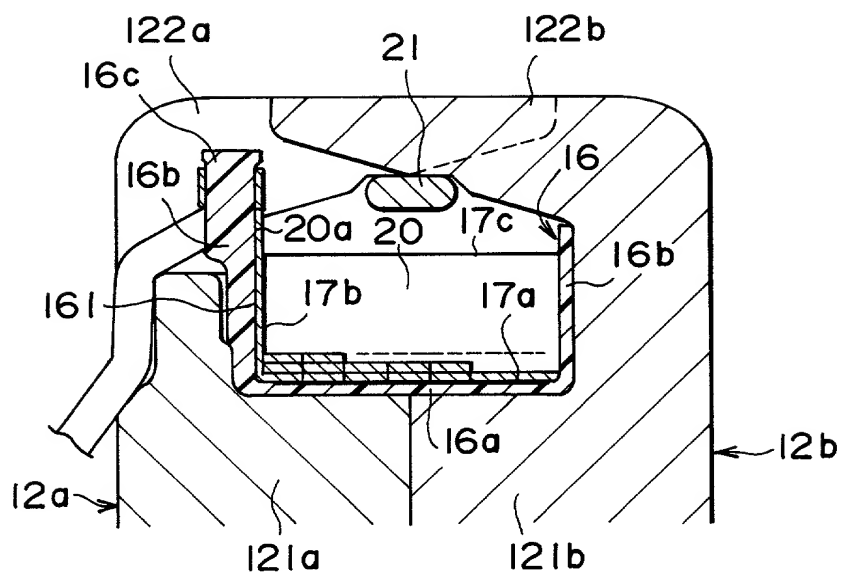
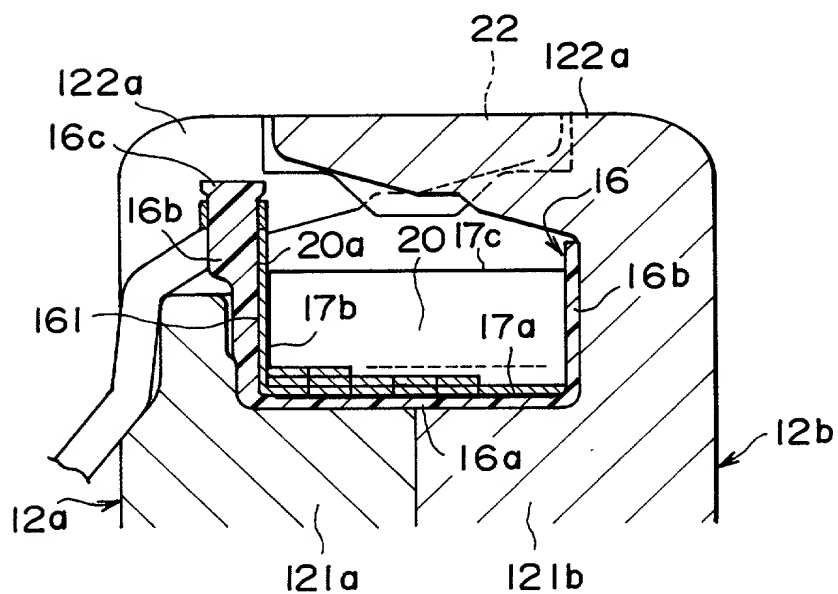


FIG. 5



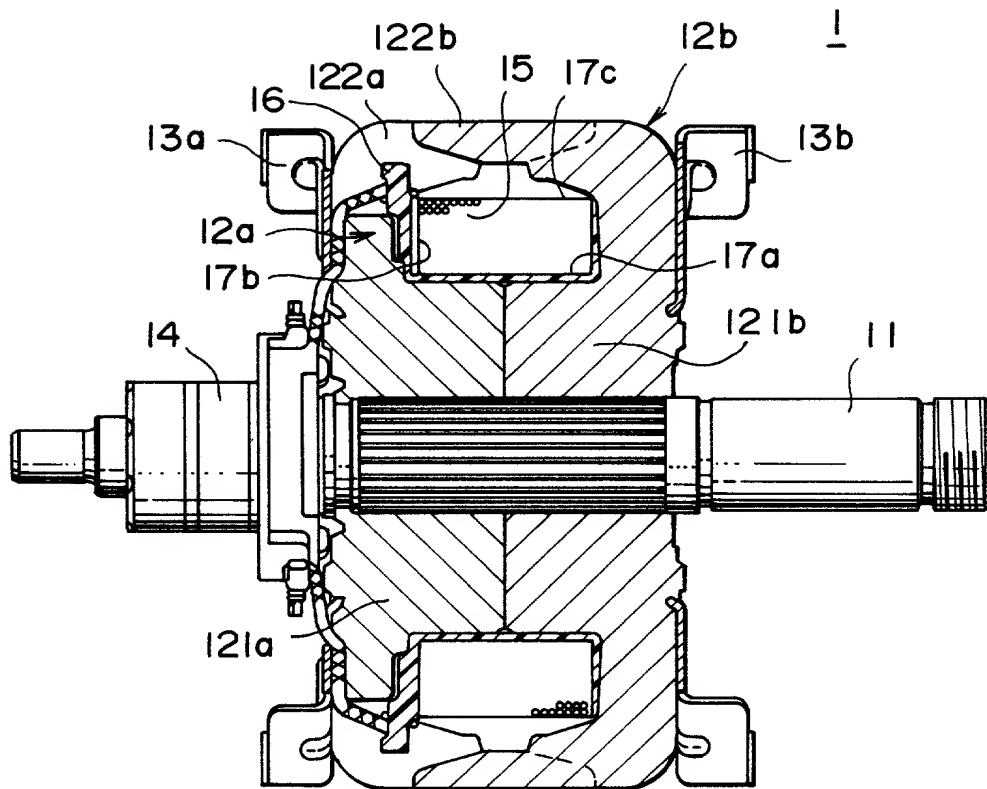


FIG. 7

PRIOR ART

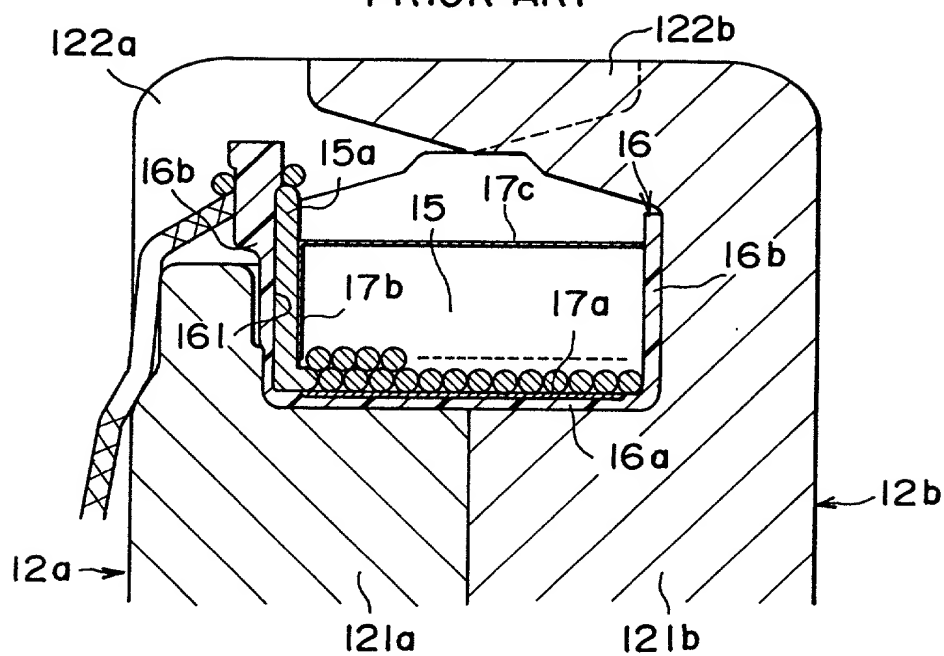


FIG. 8

PRIOR ART

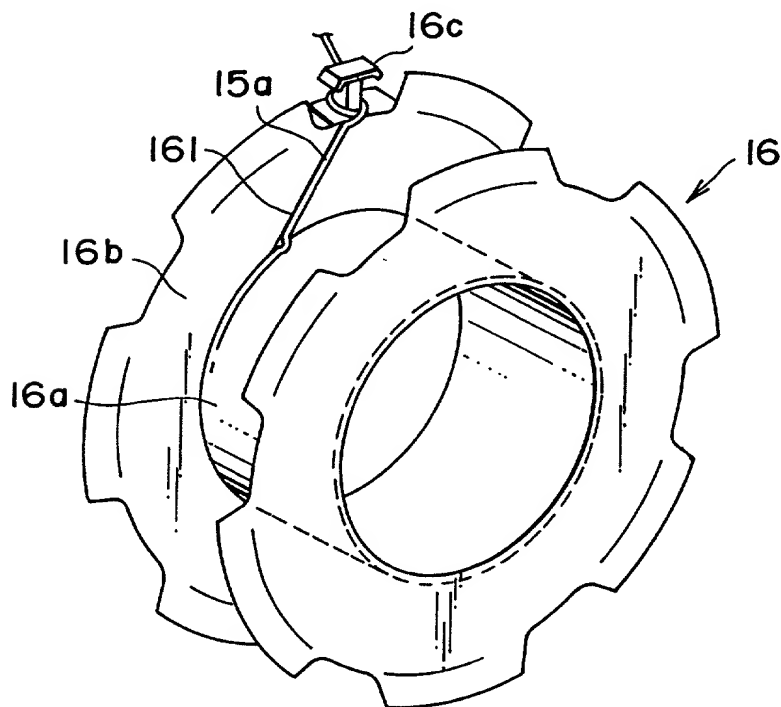


FIG. 9

PRIOR ART

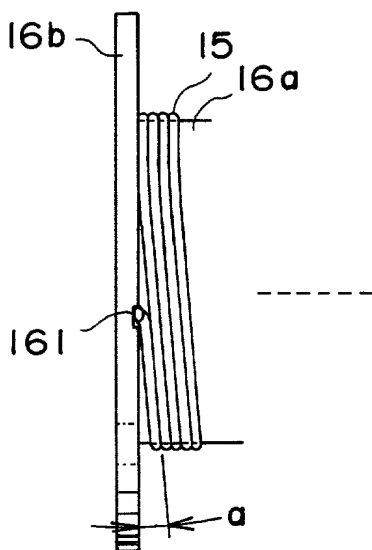


FIG. 10

PRIOR ART

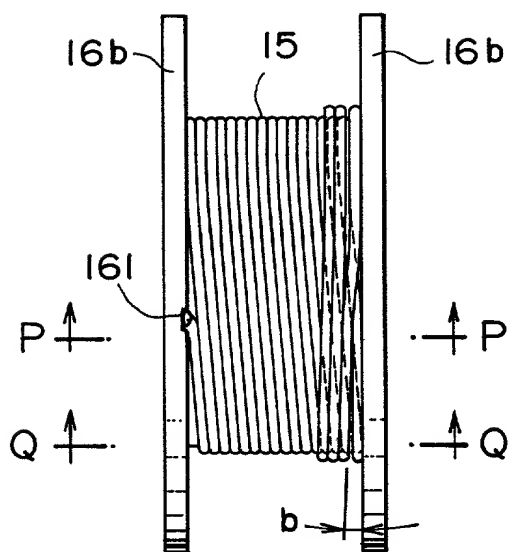


FIG. 11
PRIOR ART

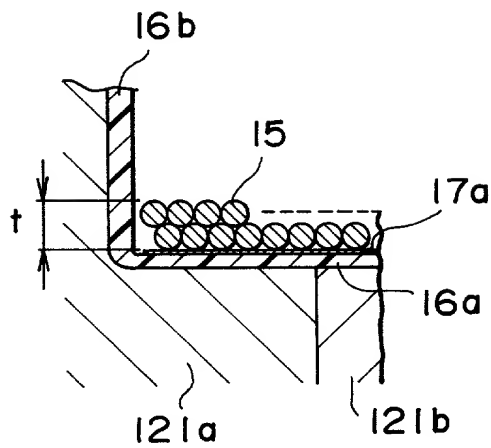
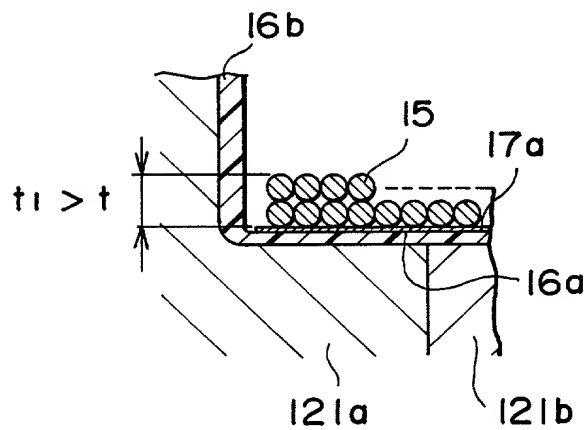


FIG. 12
PRIOR ART



Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者（下記の名称が複数の場合）であると信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled.

ROTOR FOR AN AUTOMOTIVE ALTERNATOR

上記発明の明細書は、

the specification of which

☐ 本書に添付されています。

☒ is attached hereto.

☐ ____月____日に提出され、米国出願番号または特許協定条約国際出願番号を____とし、
(該当する場合) ____に訂正されました。

☐ was filed on _____
as United States Application Number or
PCT International Application Number
_____ and was amended on
_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1条56項に定義されたとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Japanese Language Declaration (日本語宣言書)

私は、米国法典第35編119条 (a) - (d) 項又は365条 (b) 項に基づき下記の、米国以外の国の少なくとも一カ国を指定している特許協力条約365 (a) 項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

Prior Foreign Application(s)
外国での先行出願

<u>10-251490</u>	<u>Japan</u>
(Number) (番号)	(Country) (国名)
(Number) (番号)	(Country) (国名)

私は、第35編米国法典119条 (e) 項に基づいて下記の米国特許出願規定に記載された権利をここに主張いたします。

<u>(Application No.)</u> (出願番号)	<u>(Filing Date)</u> (出願日)
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私は、下記の米国法典第35編120条に基づいて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約365条 (c) に基づく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第37編1条56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

<u>(Application No.)</u> (出願番号)	<u>(Filing Date)</u> (出願日)
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私は、私自信の知識に基づいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じているところに基づく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Claimed
優先権主張

<u>04 / 09 / 1998</u>	<input checked="" type="checkbox"/> Yes はい	<input type="checkbox"/> No いいえ
(Day/Month/Year Filed) (出願年月日)	<input type="checkbox"/> Yes はい	<input type="checkbox"/> No いいえ
(Day/Month/Year Filed) (出願年月日)		

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

<u>(Application No.)</u> (出願番号)	<u>(Filing Date)</u> (出願日)
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I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

<u>(Status: Patented, Pending, Abandoned)</u> (現況: 特許許可済、係属中、放棄済)
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<u>(Status: Patented, Pending, Abandoned)</u> (現況: 特許許可済、係属中、放棄済)
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration

委任状： 私は、下記発明者として、以下の代理人をここに
 選任し、本願の手続きを遂行すること並びにこれに関する一
 切の行為を特許商標局に対して行うことを委任する。
 (代理人氏名及び登録番号を明記のこと)

POWER OF ATTORNEY: As a named inventor, I hereby
 appoint the following attorney(s) and/or agent(s) to
 prosecute this application and transact all business in the
 Patent and Trademark Office connected therewith (list
 name and registration number)

I hereby appoint John H. Mion, Reg. No. 18,879; Donald E. Zinn, Reg. No. 19,046; Thomas J. Macpeak, Reg. No. 19,292;
 Robert J. Seas, Jr., Reg. No. 21,092; Darryl Mexic, Reg. No. 23,063; Robert V. Sloan, Reg. No. 22,775; Peter D. Olexy, Reg.
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 No. 33,276; Bruce E. Kramer, Reg. No. 33,725; Paul F. Neils, Reg. No. 33,102; and Brett S. Sylvester, Reg. No. 32,765, my
 attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and
 request that all correspondence about the application be addressed to SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC, 2100
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書類の送付先:

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唯一の又は第一の発明者の氏名	Full name of sole or first inventor	
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第二の共同発明者の氏名 (該当する場合)	Full name of second joint inventor, if any	
	Kyoko HIGASHINO ✓	
同第二発明者の署名	日付	Second inventor's signature Date
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(第三又はそれ以降の共同発明者に対しても同様な情報
 および署名を提供すること。)

(Supply similar information and signature for third and
 subsequent joint inventors.)

Japanese Language Declaration

	Full name of third joint inventor, if any Katsumi ADACHI
日付	Third Inventor's signature <i>Katsumi Adachi</i> Date <i>March 1, 1999</i>
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	Full name of fourth joint inventor, if any
日付	Fourth Inventor's signature Date
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address

	Full name of fifth joint inventor, if any
日付	Fifth Inventor's signature Date
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address

	Full name of sixth joint inventor, if any
日付	Sixth inventor's signature Date
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address

(第六またはそれ以降の共同発明者に対しても同様な情報および署名を提供すること。)

(Supply similar information and signature for third and subsequent joint inventors.)